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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/741,804      | 12/22/2000  | Jun Hayakawa         | 501.39395X00        | 9059             |

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EXAMINER

NGUYEN, DZUNG C

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2652

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/741,804

Applicant(s)

HAYAKAWA ET AL.

Examiner

Dzung C Nguyen

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1/2/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Applicant's reconsideration filed on 1/02/03 has been received and entered.
2. Claims 1-8 are presented for examination.

#### *Claim Objections*

3. Claims 4 and 6 are objected to because of the following informalities: claim 4, the phrase "the interlayer" (line 2) should read "the intermediate layer". Appropriate correction is required.

#### *Claim Rejections - 35 U.S.C. § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al, US patent (6,221,172) in view of Hayashi et al , US patent (6,133,732).

Regarding claim 1, Saito et al teach a magnetic head [fig 7] having a magnetoresistive film [fig 7] comprising an anti-ferromagnetic layer [51], a ferromagnetic-pinned layer [52], a non-magnetic intermediate layer [53], a soft magnetic free layer [59] and an layer of metal (protecting film) [61] selected from Ta [Ta col. 41 lines 10-11] this order on a substrate [50] (see figs 7 and col. 39 line 34 to col. 41 line 55).

Saito et al do not teach that the metal layer (protecting layer) is an oxide layer of metal or an alloy.

Hayashi et al teach that the protective layer [18] is an oxide metal or an alloy (see fig 2 and col.14, lines 52-60 and col.16 lines 21-29).

It would have been obvious to one of ordinary skill in the magnetoresistive art at the time the invention was made to modify the of metal layer (protecting film) as taught by Saito et al by an oxide metal layer as taught by Hayashi et al because the modification would improve the corrosion resistance (see Hayashi et al col.14, lines 52-60).

Regarding claim 2, Saito et al teach wherein the anti-ferromagnetic layer [51], the ferromagnetic pinned layer [52], the non-magnetic intermediate layer [55], and a non-magnetic and conductive film [59] between the soft magnetic free layer [58] and the layer metal layer [61] are laminated in this order on a substrate [50] (see figs 1 and 2).

Regarding claims 3, 5 and 7, Saito et al do not teach wherein the thickness of the metal oxide layer (protecting layer) is 1.0 nm or less.

It would have been obvious to one of ordinary skill in the magnetoresistive thin film head to form the thickness of the metal oxide layer by 1.0 nm or less as claimed through routine lab experimentation and optimization to optimize the resistance of read/write head (see Hayashi et al col.14, lines 52-60).

Regarding claims 4 and 6, Saito et al teach wherein the intermediate layer [55] coupling field showing a magnitude of the ferromagnetic coupling between the ferromagnetic pinned layer [52] and the soft magnetic free layer [58] is substantially zero (see figs 7).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dorius et al, US patent (6,069,769) in view of Saito et al, US patent (6,221,172) and further in view of Hayashi et al , US patent (6,133,732).

Regarding claim 8, Dorius et al teach a magnetic recording apparatus [fig 3] including a magnetic recording medium [212] for recording information, a magnetic head [213], a head slider [213] for holding the magnetic head, an actuator [215] for guiding the head slider [213] to a predetermined recording position of the recording position on the recording medium [212], a spindle motor [214] rotating the recording medium and a signal processing system [333] for processing information read out of the magnetic recording medium [212] (see fig 1).

Dorius et al do not teach the details of the magnetoresistive thin film as claimed.

Saito et al teach a magnetic head [fig 7] having a magnetoresistive film [fig 7] comprising an anti-ferromagnetic layer [51], a ferromagnetic-pinned layer [52], a non-magnetic intermediate layer [53], a soft magnetic free layer [59] and an layer of metal (protecting film) [61] selected from Ta [Ta col. 41 lines 10-11] this order on a substrate [50] (see figs 7 and col. 39 line 34 to col. 41 line 55).

Saito et al do not teach that the metal layer (protecting layer) is an oxide layer of metal or an alloy.

Hayashi et al teach that the protective layer [18] is an oxide metal or an alloy (see fig 2 and col.14, lines 52-60 and col.16 lines 21-29).

It would have been obvious to one of ordinary skill in the magnetoresistive art at the time the invention was made to modify the of metal layer (protecting film) as taught by Saito et al by an oxide metal layer as taught by Hayashi et al because the modification would improve the corrosion resistance (see Hayashi et al col.14, lines 52-60).

It would have been obvious to one of ordinary skill in the magnetic head art at the time the invention was made to use the magnetic head as taught by Saito in the slider of Dorius et al because it could maintain the magnetic head in thermally stable condition (see Saito col. 29 lines 64-65).

7. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

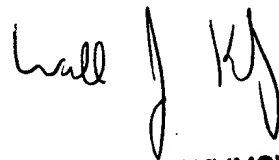
*The prior art made of record and not relied upon*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a. Sakakima et al, US. Patent (6,258,470).
  - b. Shimazawa et al, US patent (6,4000,535).
  - c. Yamanobe et al, US patent (6,165,607).
  - d. Hoshiya et al, US patent (6,125,019).
  - e. Nishioka et al, US patent (5,327,313).
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung Nguyen whose telephone number is (703) 305-9695. The examiner can normally be reached on Monday-Friday from 8:30 am to 6:00 pm.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900 and fax number is (703) 872-9314.

Dzung Nguyen

3/5/03



**WILLIAM KLIMOWICZ  
PRIMARY EXAMINER**